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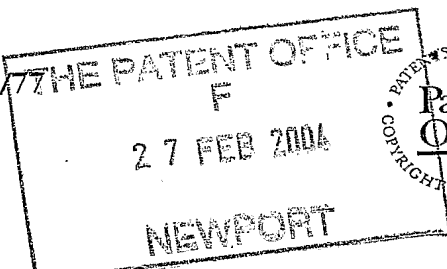
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1. Your reference

P36562-/NGR/GMU

28FEB04 0876722-2 002884

POL/7700 5.07-0404357.6 CHEWIE

2. Patent application number

(The Patent Office will fill this part in)

0404357.6

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Rocep Lusol Holdings Limited
Rocep Business Park
Rocep Drive
Deanpark
Renfrew
PA4 8XY

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

United Kingdom

6837674002

4. Title of the invention

"Dispenser Valve with Adjustable Flow Rate"

5. Name of your agent (if you have one)

Murgitroyd & Company

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

165-169 Scotland Street
Glasgow
G5 8PL

Patents ADP number (if you know it)

1198015

6. Priority: Complete this section if you are declaring priority from one or more earlier patent applications, filed in the last 12 months.

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Continuation sheets of this form -

Description 17

Claim(s) -

Abstract -

Drawing(s) 3 13 10

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Priority documents -

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Statement of inventorship and right to grant of a patent (Patents Form 7/77) -

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Signature(s)

Murgitroyd & Co.

Date 26 Feb 2004

12. Name, daytime telephone number and e-mail address, if any, of person to contact in the United Kingdom

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1 DISPENSER VALVE WITH ADJUSTABLE FLOW RATE

2

3 This invention relates to dispensing apparatus and
4 to a user operated valve assembly for use with a
5 dispensing apparatus. Particularly, but not
6 exclusively it relates to a dispensing apparatus and
7 valve assembly for dispensing viscous materials from
8 a container under pressure of a propellant.

9

10 It is known to provide a dispensing apparatus which
11 includes a valve mechanism fitted to a container
12 filled with a product, for example mastic or
13 sealant, which is to be dispensed. An example of
14 such an apparatus is disclosed in WO 01/49585 (Rocep
15 Lusol Holdings Limited). The user presses the
16 handle of a lever to open the valve and dispense
17 product from the pressurised container. However
18 such dispensers are intended for use only in
19 situations where a full flow of product is required.
20 There is no intermediate setting of the valve which
21 permits an intermediate flow rate, and it can be

1 difficult to ensure a steady stream of flow unless
2 the valve is fully open.

3
4 It is an object of the present invention to provide
5 a dispensing apparatus which overcomes one or more
6 of the above disadvantages.

7
8 According to a first aspect of the present invention
9 there is provided a valve assembly for use with a
10 dispensing apparatus, the valve assembly comprising:

11 a valve;
12 a lever having a bearing portion; and
13 an actuator which co-operates with the bearing
14 portion of the lever such that operation of the
15 lever from a primed position to a dispensing
16 position causes movement of the actuator to open the
17 valve;

18 wherein the lever comprises an adjustable
19 spacing means which can be adjusted to limit the
20 travel of the lever.

21
22 Preferably the adjustable spacing means comprises an
23 abutting member which is movable to a selected one
24 of a plurality of positions. Preferably the
25 abutting member is adapted to space the lever from a
26 container with which the valve assembly is used at
27 the limit of travel of the lever.

28
29 Preferably the abutting member is arranged such that
30 for each of the plurality of positions of the
31 abutting member there is a corresponding position of
32 the lever at the limit of travel of the lever.

1
2 Preferably the lever includes a handle which in use
3 extends along a portion of the side of a container
4 with which the valve assembly is used. Preferably
5 the adjustable spacing means is provided at the
6 handle. Preferably the lever is substantially L-
7 shaped. The angle of the L-shape may be understood
8 to be between approximately 60 degrees and 120
9 degrees, depending on the shape of the container
10 with which the valve assembly is used. Preferably
11 the bearing portion is provided on a first leg of
12 the L-shape and the handle is provided on the other,
13 second leg of the L-shape.

14
15 Preferably the valve assembly includes fixing means
16 for fixing the valve assembly to a container. The
17 fixing means may be a mounting cup.

18
19 Preferably the lever is pivotally connected to the
20 valve assembly by a hinge. Preferably the hinge is
21 at the free end of the first leg of the L-shape.
22 The hinge may be provided on a collar secured to the
23 valve. The collar may be secured by the fixing
24 means.

25
26 In one embodiment the actuator is provided with a
27 cam surface which co-operates with the lever bearing
28 portion, such that upon rotation of the actuator the
29 lever bearing portion is raised by action of the cam
30 surface.

31

1 Preferably the cam surface comprises one or more
2 depressions and one or more raised surfaces.

3
4 Preferably the lever has two lever bearing portions
5 arranged at opposite sides of the valve. Preferably
6 the actuator is a ring and the cam surface comprises
7 two depressions arranged at opposite sides of the
8 ring and two raised surfaces arranged between the
9 depressions at opposite sides of the ring.

10
11 In a further embodiment the actuator is threadedly
12 engaged with a valve stem of the valve. Preferably
13 the actuator is provided with a bearing surface
14 which co-operates with the lever bearing portion,
15 such that upon rotation of the actuator relative to
16 the valve stem the lever bearing portion is raised
17 by action of the bearing surface.

18
19 Preferably the valve assembly includes a nozzle
20 which is rotationally coupled to the actuator.
21 Preferably the actuator comprises a ring member
22 arranged at a lower end of the nozzle. The actuator
23 may be integral with the nozzle.

24
25 Preferably the actuator is provided with means to
26 limit the rotational travel of the actuator. These
27 means may comprise two end stops provided on the
28 actuator adapted to locate against an upstand on the
29 valve assembly.

30
31 Preferably the valve is a tilt valve. Tilt valves
32 are generally known in dispensing apparatus and

1 operate by tilting of a hollow central stem which is
2 resiliently held on a mounting cup by a rubber
3 grommet. The stem is closed at its lower end by a
4 sealing plate. When the stem is tilted, the seal
5 between the grommet and the sealing plate is broken
6 and the product can reach apertures in the central
7 stem and thence flow along the hollow stem.

8
9 Preferably the actuator comprises one or more dog
10 teeth and the hinge assembly comprises one or more
11 slots, adapted such that a dog tooth can enter a
12 slot only when the nozzle assembly is in the open
13 position. The nozzle assembly is preferably coupled
14 to the valve stem for longitudinal movement, such
15 that movement of the nozzle assembly towards the
16 container causes the dog tooth to enter the slot and
17 the valve stem to move, thereby opening the valve to
18 release the product.

19
20
21 According to a second aspect of the present
22 invention there is provided a dispensing apparatus
23 comprising a container, a nozzle and a valve
24 assembly arranged between the container and the
25 nozzle, the valve assembly comprising:

26 a valve;
27 a lever having a bearing portion; and
28 an actuator which co-operates with the bearing
29 portion of the lever such that operation of the
30 lever from a primed position to a dispensing
31 position causes movement of the actuator to open the
32 valve;

1 wherein the lever comprises an adjustable
2 spacing means which can be adjusted to limit the
3 travel of the lever.

4
5 Preferably the adjustable spacing means comprises an
6 abutting member which is movable to a selected one
7 of a plurality of positions. Preferably the
8 abutting member moves by sliding. Preferably the
9 abutting member is adapted to engage resiliently in
10 each of the plurality of positions.

11
12 Preferably the lever has a handle portion.
13 Preferably the abutting member is adapted to space
14 the handle portion of the lever from the container
15 at the limit of travel of the lever.

16
17 Preferably the abutting member is arranged such that
18 for each of the plurality of positions of the
19 abutting member there is a corresponding position of
20 the handle at the limit of travel of the lever.

21
22 Preferably the valve assembly is a valve assembly
23 according to the first aspect of the invention.

24
25 Preferably the actuator is provided with a cam
26 surface which co-operates with the lever bearing
27 portion. Preferably the actuator is rotationally
28 coupled to the nozzle.

29
30 Preferably the apparatus comprises means for urging
31 the product from the container. Preferably the
32 container is pressurised. The container may contain

1 a propellant. The container may contain a piston,
2 situated between the propellant and the valve.

3
4 Preferably the valve comprises a mounting cup
5 adapted to secure the valve to the container.
6 Preferably the container is provided with a rolled
7 flange portion and the mounting cup is provided with
8 a corresponding flange portion adapted to engage
9 with the rolled flange portion of the container.

10
11 Specific embodiments of the invention will now be
12 described, by way of example only, with reference to
13 the accompanying drawings in which:

14
15 Fig. 1 shows a valve assembly according to the
16 invention;

17
18 Fig. 2 is a side elevation on the valve
19 assembly of Fig. 1 with the lever in a parked
20 position;

21
22 Fig. 3 is a side elevation on the valve
23 assembly of Fig. 1 with the lever in a primed
24 position;

25
26 Fig. 4 shows a section through the valve
27 assembly of Fig. 1 with the lever in the primed
28 position;

29
30 Fig. 5 shows a section through the valve
31 assembly of Fig. 1 with the lever in a dispensing
32 position with an intermediate flow setting;

1
2 Fig. 6 shows a section through the valve
3 assembly of Fig. 1 with the lever in a dispensing
4 position with a full flow setting;
5 the primed position;

6
7 Fig. 7 is a plan view on the hinge collar of
8 the valve assembly of Fig. 1;

9
10 Fig. 8 is a side view on the nozzle and
11 actuator of the valve assembly of Fig. 1;

12
13 Figs. 9, 10 and 11 show a perspective view, a
14 longitudinal section and a transverse section
15 respectively of the adjustable spacer of a valve
16 assembly according to the invention; and

17
18 Figs. 12 and 13 show the adjustable spacer and
19 the abutting member respectively of another valve
20 assembly according to the invention.

21
22 Referring to Figs. 1 to 6 of the accompanying
23 drawings, there is disclosed a valve assembly 10
24 fitted on a container 12 to form a dispensing
25 apparatus 11. In this example, the container 12 is
26 an aluminium monoblock container of the sort widely
27 used in aerosol applications. It is envisaged that
28 the can 12 could be of tin plate, steel or any
29 conventional can construction having a standard one
30 inch (25 mm) hole in the top. The can may be
31 internally lacquered. However the valve assembly of
32 the present invention can be used with a container

1 12 of any material holding a pressurised product,
2 for example a container of plastic, glass or metal.
3

4 The valve assembly 10 includes a valve 14, a hinge
5 collar 16, a lever 18 and an actuator 20 including a
6 nozzle 22. The valve is a tilt valve of the type
7 widely used in pressurised dispensers and operated
8 by tilting the valve stem 30. The valve stem 30 is
9 a hollow plastic tube with apertures 32 in the tube
10 wall at the lower end. The upper end 34 is open,
11 while the lower end is closed by a plastic sealing
12 disc 36. A resilient grommet 38 of rubber or
13 synthetic material surrounds the lower portion of
14 the stem 30 and is held in place by the sealing disc
15 36 and a retaining collar 31 formed on the outside
16 of the stem 30.

17
18 The grommet 38 is sealed to a mounting cup 44 of
19 metal. The mounting cup has an outer flange 48
20 which is adapted to fit around a rolled flange 13
21 which extends around the opening of the container
22 12. When the stem 20 is pushed in the direction of
23 arrow A relative to the mounting cup 44, the sealing
24 disc 36 is pushed away from the grommet 38, and
25 material in the container 12 is free to pass between
26 the sealing disc 36 and grommet 38, through the
27 apertures 32, along the inner bore of the stem 30
28 and through the open end 34 of the stem. When the
29 stem is released, the resilience of the grommet 38
30 pushes the stem back in a direction opposite to
31 arrow A and seals the valve again.
32

1 The hinge collar can be seen more clearly in Fig. 7.
2 The hinge collar 16 is moulded from plastic and
3 comprises a ring 60 having a central aperture 62.
4 The ring 60 is provided with a circumferential
5 groove 64 adapted to snap on to the outer flange 48
6 of the mounting cup 44. A discontinuous flange 66
7 projects into the aperture 64, forming two slots 68,
8 whose purpose is explained later. An upstand 70 is
9 provided with a through bore 72 adapted to house the
10 ends of a wire lever 18, thereby forming a hinge for
11 the lever. The lever 18 comprises a handle 102,
12 which extends along the side of the container 12,
13 and a lever arm 104. The lever 18 is preferably
14 formed from a single piece of wire, whose two free
15 ends are mounted in opposite sides of the upstand
16 70. However the lever is not limited to such a
17 construction. For example the lever may be a
18 moulded plastic handle, and may be formed in one
19 piece with the hinge collar, with a resilient
20 plastic hinge connecting the hinge collar and lever.

21
22 The actuator 20 can be seen more clearly in Fig. 8
23 and includes an elongate tapering nozzle 22 with a
24 removable end cap 82 (shown in Figs. 1 and 2), which
25 may be click-fit, screw-fit or simple taper fit.
26 The actuator 20 is free to rotate about its
27 longitudinal axis relative to the hinge collar 16
28 and lever 18. Although in the illustrated example
29 the nozzle 22 is integral with the actuator 20 it is
30 to be understood that they may be formed separately
31 and coupled so that one rotates with the other.
32

1 Rotation of the actuator can be limited by the
2 provision of end stops (not shown), which come into
3 contact with corresponding contact surfaces formed
4 on the hinge assembly 16. The first end stop can be
5 arranged such that when it is in contact with the
6 contact surface, the actuator is in the closed
7 position as shown in Figs 1 and 2. If the actuator
8 20 is rotated by 90° in a counter-clockwise
9 direction, so that the second end stop is in contact
10 with its contact surface, then the actuator is in
11 the open position, as shown in Fig 3.

12
13 When the dispenser is transported and is stored
14 before first use, a removable tab 86 attached to a
15 fin 92 of the nozzle assembly prevents any rotation
16 of the nozzle from the closed position by engaging
17 in a slot 88 on the upstand 70. Only after removal
18 of the tab, by folding and snapping or tearing, can
19 the nozzle be rotated. It is to be understood that
20 the provision of a locking tab 86 is optional, and
21 the invention may function without a locking tab.

22
23 The actuator 20 is provided with four fins, two
24 shorter fins 92 and two longer fins 94. The base 90
25 of the actuator controls the opening of the valve
26 and is provided with a cam surface which has two
27 depressions 98 adjacent to the longer fins 94 and
28 two raised surfaces 96 adjacent to the shorter fins
29 92. The lever arm 104 of the lever 18 has a bearing
30 portion 100 which is adapted to fit on the
31 depression 98 when the actuator is in the closed
32 position. Upon rotation of the actuator 20, the cam

1 surface pushes the bearing portion 100 up until it
2 is raised to the level of the raised surface 96,
3 where it is held between the shorter fin 92 and the
4 raised surface 96.

5
6 As the bearing portion 100 is raised, the handle 102
7 on the lever 18 is moved away from the side of the
8 container 12, from the parked position shown in Fig
9 2 to the primed position shown in Fig 3.

10
11 In a further screw thread embodiment of the
12 invention, not illustrated, the actuator 20 is
13 threadedly engaged with the valve stem 30 of the
14 valve 14. The actuator 20 is provided with a
15 bearing surface which co-operates with the lever
16 bearing portion 100, such that upon rotation of the
17 actuator relative to the valve stem 30 the lever
18 bearing portion 100 is raised by action of the
19 bearing surface, so that the lever 18 is moved from
20 a parked position to a primed position.

21
22 Referring again to Figs. 1 to 8, the base 90 of the
23 actuator 20 is provided with a cylindrical extension
24 110 which has an internal diameter adapted to fit
25 slidably around the inner flange of the mounting cup
26 44. The inner surface of the cylindrical extension
27 110 engages with a protruding part 41 of the grommet
28 38 adjacent to the groove 40, to form a seal which
29 prevents the product passing between the valve 14
30 and the nozzle 22.

31

1 Arranged outside the extension 110 are two dogs 112,
2 which in the closed position of the actuator (as in
3 Fig 2) are aligned on top of the flange 66 in the
4 hinge assembly. In this position the nozzle
5 assembly 20 cannot be moved in the direction of
6 arrow A relative to the hinge assembly 16, because
7 the dogs 112 will interfere with the flange 66.
8 However, when the actuator 20 is rotated to the
9 primed or open position (as in Fig 3) the dogs 112
10 are aligned with the slots 68 formed by the gaps in
11 the flange 66, and the nozzle assembly 20 can be
12 moved in the direction of arrow A, so that the dogs
13 112 enter the slots 68.

14

15 It is to be understood that the nozzle assembly may
16 be provided with only one dog 112, and the hinge
17 assembly with only one slot 68.

18

19 When the actuator is in the primed or open position,
20 as in Fig 3, then depression of the handle 102
21 towards the container 12 causes the bearing portion
22 100 of the lever 18 to push the actuator 20 in the
23 direction of arrow A towards the hinge assembly 16.
24 The actuator 20 is linked to the valve stem 30 to
25 prevent relative longitudinal movement of the valve
26 14 and nozzle 22. The linking means may comprise a
27 thread or a rib and groove arrangement.

28

29 As can be seen in Fig 5, a shoulder 120 on the
30 inside of the actuator 20 bears on the collar 31 on
31 the outside of the valve stem 30 and pushes the
32 valve stem against the resilience of the grommet 38

1 in the direction of Arrow A. This causes the disc
2 36 to move away from the grommet and allow product
3 to be expelled under pressure from the container
4 through the nozzle 22.

5
6 The actuator and nozzle assembly 20 is a single
7 moulded piece of plastic. The nozzle assembly 20,
8 the hinge assembly 16 and the lever 18 can be
9 preassembled to form a complete nozzle/hinge sub-
10 assembly and then secured to the container 12 during
11 the filling process. In practice the container is
12 filled, the valve 14 is secured to the container by
13 crimping the flange 48, then the nozzle/hinge sub-
14 assembly is snapped onto the mounting cup of the
15 valve.

16
17 Before filling the container 12 with product and
18 before fitting the valve and nozzle/hinge assembly,
19 a piston assembly (not shown) is inserted into the
20 container 12. A suitable piston assembly is
21 described in our co-pending International Patent
22 Application No PCT/GB98/03003. However the piston
23 assembly does not form part of the present
24 invention, and any suitable automatic or manual
25 pressure inducing arrangement may be used in
26 connection with the apparatus of the present
27 invention, including conventional aerosol cans.

28
29 To dispense a product, the tab 86 is broken, the end
30 cap 82 is removed and the nozzle 22 may be cut open,
31 if it is not supplied already open. The actuator 20
32 is then twisted relative to the hinge assembly 16.

1 Twisting is made easy by the provision of the four
2 fins 92, 94, which are readily grasped by hand. A
3 90° turn will fully open the pack. As the actuator
4 20 turns from the closed position of Fig 2 to the
5 primed position of Fig 3, the lever handle 102 lifts
6 on the hinge 72 due to the action of the camming
7 surface 96, 98 against the bearing portion 100 of
8 the lever arm 104.

9
10 To dispense product, a user then presses down on the
11 lever handle 102, moving it from the primed position
12 shown in Fig 4 towards the body of the container 12
13 to adopt the dispensing position shown in Fig 5 or
14 6.

15
16 As seen more clearly in Figs 9 to 11, the handle 102
17 includes a plate 120, typically of moulded plastic,
18 which may be fixed by snap fit or sliding onto the
19 wires 122 which form the handle. The plate 120 is
20 provided with an adjustable spacing means 124 in the
21 form of an abutting member 126 which is held in a
22 slot 128 in the plate 120. The abutting member 126
23 has a thumb grip 130 and can slide longitudinally
24 along the handle 102. When the abutting member 126
25 is in a first position shown in Fig 5, the handle
26 102 can only move a limited distance towards the
27 container 12 to a first dispensing position, so that
28 the valve 14 is only opened to an intermediate flow
29 position. When the abutting member 126 is in a
30 second position shown in Fig 6, the handle 102 can
31 move a greater distance towards the container 12 to

1 a second dispensing position, so that the valve 14
2 is opened to a fully open flow position.

3
4 It is to be understood that detent formations may be
5 formed in the abutting member 126 and/or plate 120
6 so that the adjustable spacing means 124 is readily
7 set at the required dispensing position. If the
8 abutting member 126 is moved to further intermediate
9 positions, then the valve 14 may be opened to
10 further intermediate flow positions. There may be
11 two, three or more intermediate dispensing
12 positions.

13
14 The plate 120 and/or thumb grip 130 are provided
15 with markings 132 which indicate the position to
16 which the abutting member 126 must be moved to
17 achieve a particular flow position. The flow
18 position may be set while the lever 18 is in the
19 parked or primed position, so that pressing the
20 handle 102 towards the container 12 from the primed
21 position results in the required flow rate of
22 product. The abutting member 126 effectively spaces
23 the handle 102 from the container 12 at the limit of
24 travel of the lever 18. The abutting member 126 is
25 arranged such that for each of a plurality of
26 positions of the abutting member 126 there is a
27 corresponding position of the lever 18 at the limit
28 of travel of the lever.

29
30 When the valve is open product is urged to flow, by
31 virtue of the internal pressurisation of the pack,

1 through the ports 32 and up through the valve stem
2 30 and out through the nozzle 22.

3
4 To stop dispensing, the user simply releases the
5 lever handle 102. This closes the valve by allowing
6 the valve stem 30 to slide back and close access
7 through the ports 32.

8
9 The abutting member 126 may be of any suitable shape
10 or size which can be positively engaged in the slot.
11 In the example of Figs 9 to 11 the member 126
12 includes split legs 134 having detent portions 136
13 to non-removably engage with the slot. Figs 12 and
14 13 show an alternative form of abutting member 126',
15 which may be engaged by pushing through the thumb
16 grip portion 130' through the slot 128 in the
17 resilient plate 120. However the abutting member
18 may be a simple sliding device slidably mounted on
19 the wire 122 of the handle 102, or a device which
20 slidably engages with the edge of the handle plate
21 120.

22
23 Modifications and improvements may be made to the
24 foregoing without departing from the scope of the
25 invention. In particular the means of coupling
26 vertical movement of the bearing portion 100 of the
27 lever with opening of the valve is not limited to
28 the embodiments described above, and the adjustable
29 spacing means of the valve assembly of the invention
30 may be used with any suitable valve, lever and
31 actuator.

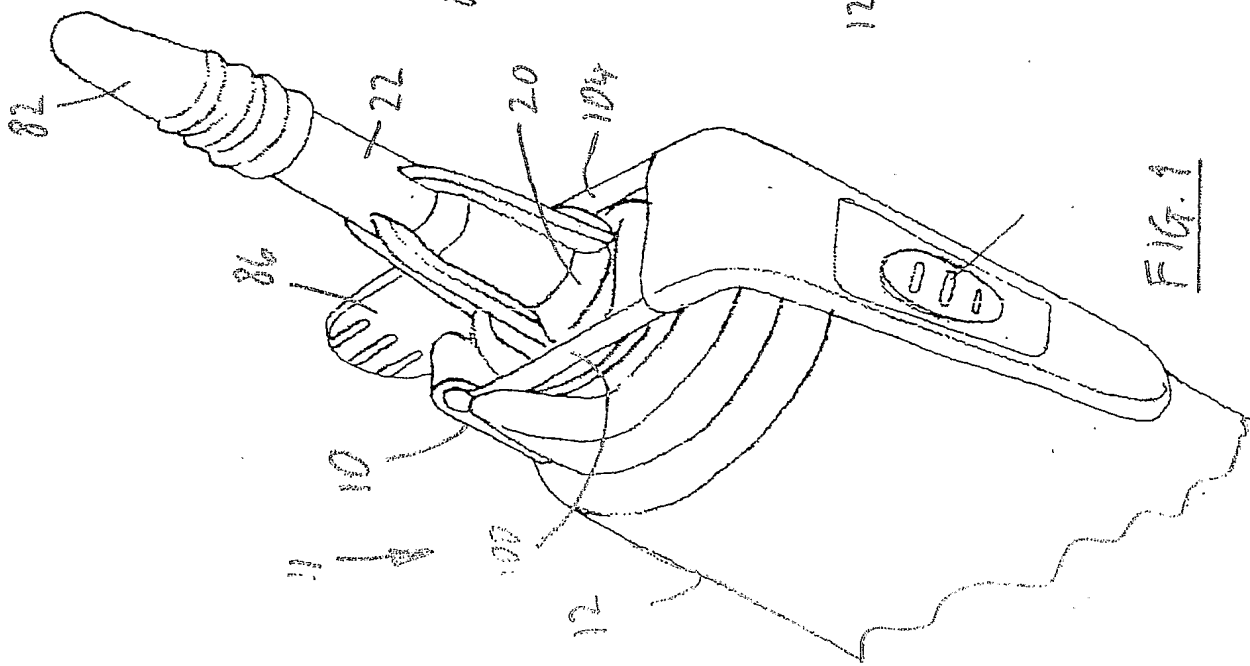


FIG. 1

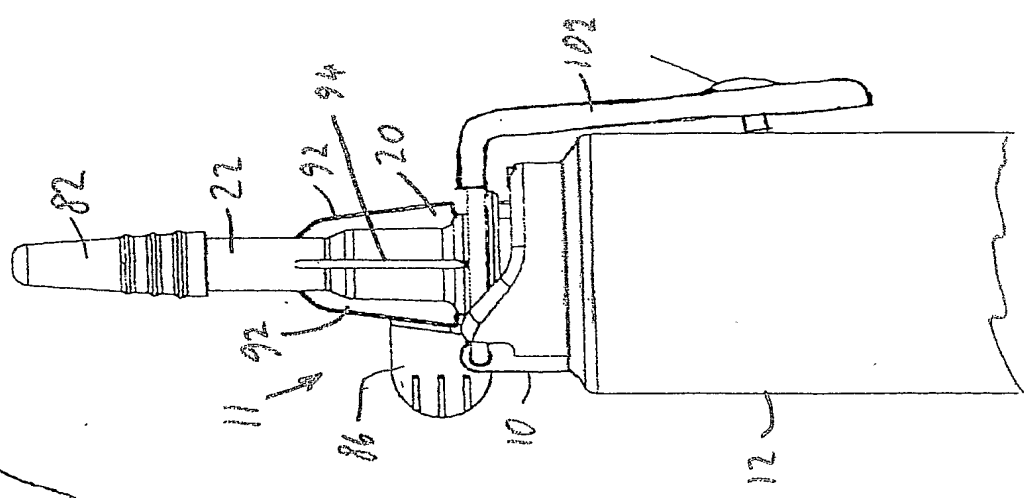


FIG. 2

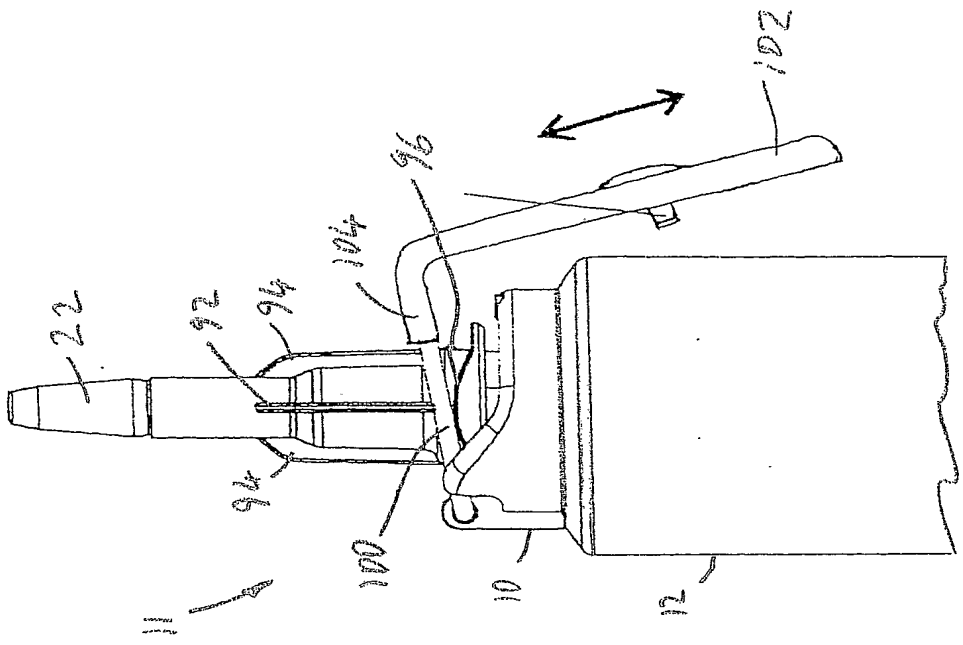
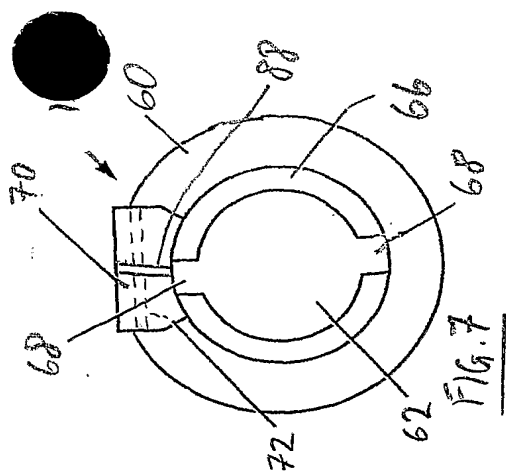


FIG. 3



2/3

